B1

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 458 725 A1**

(12) **EUROPEAN PATENT APPLICATION**

(21) Application number : **91610042.3**

(22) Date of filing : **07.05.91**

(51) Int. Cl.[5] : **E04D 13/03**, E06B 7/02, F24F 13/18

(30) Priority : **23.05.90 DK 1279/90**

(43) Date of publication of application : **27.11.91 Bulletin 91/48**

(84) Designated Contracting States : **AT BE CH DE DK ES FR GB GR IT LI LU NL SE**

(71) Applicant : **V. KANN RASMUSSEN INDUSTRI A/S**
10 Tobaksvejen
DK-2860 Soborg (DK)

(72) Inventor : **Brade, Claus Borge**
41 D, Sortedam Dossering
DK-2200 Copenhagen N (DK)
Inventor : **Moller, Brent**
24, Hoegsmindevej
DK-2820 Gentofte (DK)

(74) Representative : **Jensen, Peter Indahl et al**
c/o Internationalt Patent-Bureau Hoeje
Taastrup Boulevard 23
DK-2630 Taastrup (DK)

(54) **Window with mechanical ventilation.**

(57) A window comprises a stationarily installed main frame (1) and a glass-supporting sash (2) journalled therein, to which a ventilating chamber (9) is hinged opposite a ventilation air flow passage discharging in the outside air, said chamber being tiltable upwards from the illustrated intermediate position with natural ventilation through a gap (11) so as to cover the flow passage. In this position a fan (20) accommodated within the chamber may ventilate air into the chamber through air inlet openings (21) and out of the chamber into the outside air through outlet openings (22). Existing windows may straight away be provided with a ventilating chamber (9) and new windows with sash and main frame elements of the same type may be delivered either with or without mechanical ventilation.

EP 0 458 725 A1

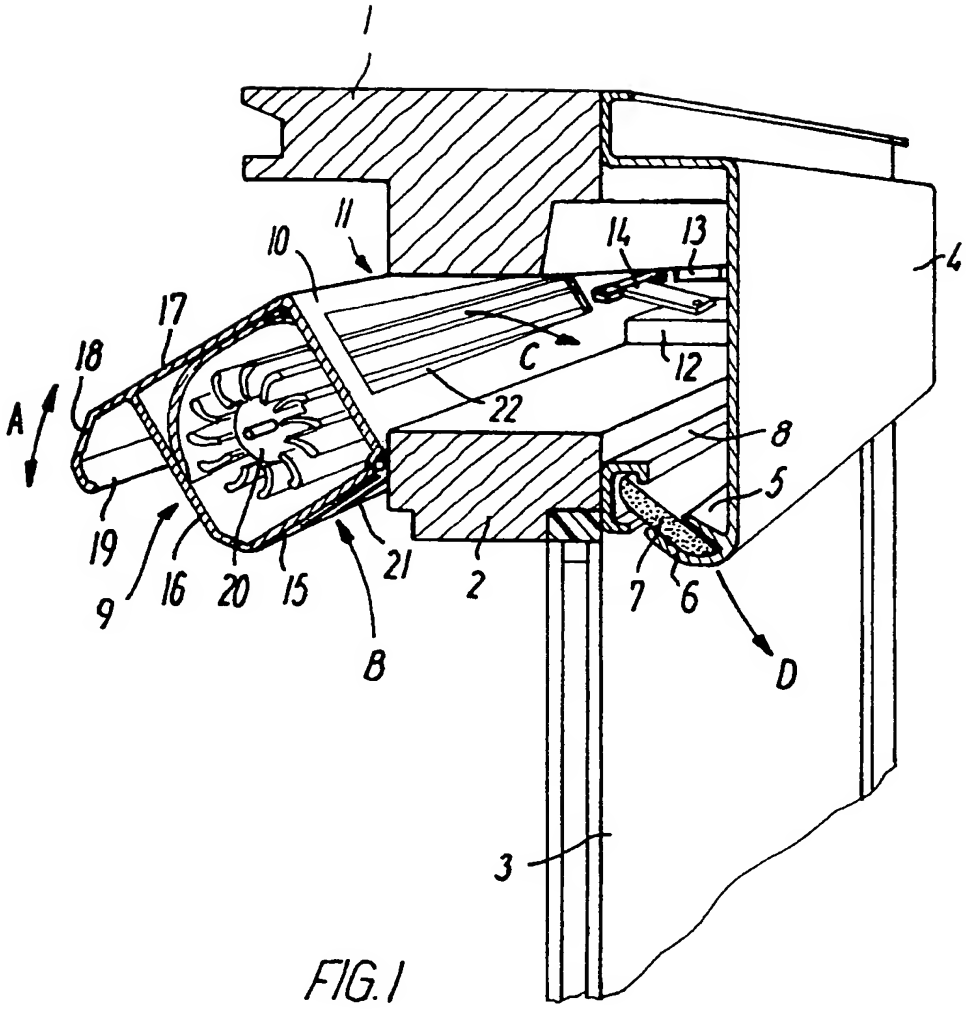

FIG. 1

The invention relates to a window having a main frame and a glass-supporting sash installed therein and a flow passage for ventilation between the air inside and outside the window, said passage comprising a chamber with an air inlet opening and an air outlet opening and with a fan.

Such a window is known from EP-A1-0372 597 in which the ventilating chamber is permanently installed as an integral part of a main frame member which further comprises an outer compartment positioned opposite the air outlet opening which through its end walls discharges the air laterally in relation to the pane, thereby making the ventilation more insensible to wind conditions. The space required by the ventilation chamber necessitates that the main frame member has a greater height than ordinary windows without mechanical ventilation.

In order to standardize the manufacture of windows to the greatest possible extent, it is desirable that the window main frame and the sash are composed of the same elements, notwithstanding the window is provided with mechanical ventilation or not.

In existing rooms with already installed windows the need might arise for mechanical ventilation, e.g. because the room has been converted to a wet room or has been provided with equipments, such as copying machines requiring mechanical exhaustion of ambient air.

In view of the fact that its is excessively expensive to break through the wall of the house or the roof to install the necessary exhaustion it has hitherto been the normal procedure to install a detached exhaust fan in the window pane. Quite apart from the fact that the light-admitting aperture of the window will then become reduced and its appearance be disfigured, it is as far as double-glazed windows are concerned, necessary to change the entire pane which is troublesome as well as expensive.

The initially mentioned window is according to the invention characterized in that it is openable and that the chamber with the fan is installed on the window sash movable in relation to the main frame.

The above inconveniences are thus eliminated and it is further made possible to standardize the manufacture of windows in such a manner that a window purchased without a fan may later on be provided with a mechanical fan obtained as a supplementary unit that may be immediately mounted on sash of the window.

It is known to form at the upper sash member, in particular in connection with openable roof windows, a ventilation gap to be barred inwardly by a flap hinged to the sash member and which is connected with an operating device for a lock fitting, e.g. of the type stated in DE patent No. 6 903 921, to which reference is made.

In a preferred embodiment of the invention in which the window is provided with a lock fitting known per se comprising a lock casing secured on a sash member, a striking plate secured on an opposite main frame member and an operating device for shifting the lock fitting between two locked positions and a release position in which the window may be opened, the previously known utilization of the lock fitting to keep the ventilation gap open is maintained in that the chamber is pivotally mounted on the sash and includes a handle rail for manual operation, and that the operating device is so connected with the chamber at a distance from the chamber pivot axis that the lock fitting is in locked position when the chamber is in one extreme position but is in the release position when the chamber is pivoted to the opposite extreme position. It has thus been rendered possible, on one hand, according to desire either to ventilate mechnically or to tilt the ventilating chamber with the fan by pulling at the handle rail, thereby exposing the flow passage located behind the chamber so as to effect natural ventilation and, on the other hand, to change the barring flap an an existing window with a ventilating chamber.

The window according to the invention is advantageously designed so that the exhaust fan is a cross-flow fan with an elongated impeller and that an air guide plate extends at increasing distance to the periphery of the impeller from the lower part of the chamber at an air inlet opening to an area next to the upper edge of a sideways facing air outlet opening. The elongated cross-flow fan allows the chamber to be elongated with a suitable small height and width in comparison with the length to impart to the window an aesthetically handsome appearance when the chamber has been mounted on the upper horizontal sash member. The guide plate enhances the degree of efficiency of the fan.

With the view of making the fan insensible to gusts of wind acting on the external side of the window and in order to prevent unintentional draught through the flow passage when the fan is stopped and a strong wind is blowing on to the window, the window is preferably provided with a check valve flap allowing outflow but not inflow of air.

Examples of embodiments of the window according to the invention will now be described in detail with reference to the very schematical and simplified drawings, in which

Fig. 1 shows an upper corner section of a first embodiment of a window,

Fig. 2 shows a cross-section through a second embodiment of a window with a ventilating chamber,

Fig. 3 is a side elevation of the chamber in Fig. 2 on a smaller scale, viewed from the window sash,

Fig. 4 is a sectional view of the connection of the chamber with the locking device of the window, and

Fig. 5 is an illustration of the chamber in Fig 3,

viewed from below.

Fig. 1 shows a section of the window capable of providing mechanical as well as natural ventilation. A stationary, upper main frame member 1 of the pivot-hung window is shown which may be installed in the roof construction or wall, not shown, and there is further shown a tiltable sash 2 carrying a double-glazed window pane 3.

The upper main frame member and sash member are outwardly shielded by a profiled flashing 4 having along its lower edge two tongues 5, 6 for carrying a filter 7 whose inward and upward facing ends abut on the glazing bead 8 secured on sash 2, when the window is closed.

Between the top surface of the upper sash member and the lower surface of the upper main frame member there is a clearance constituting part of a flow passage debouching outwardly along the top edge of the pane between tongue 6 and glazing bead 8.

A box-shaped ventilating chamber 9 is near the lower edge of its outward facing lateral wall 10 hingedly connected with sash 2 so that chamber 9 may be swung about the hinge as shown by the arrow A between a closed extreme position in which lateral wall 10, if necessary through gaskets, abuts on sash 2 as well as main frame 1, whereby chamber 9 completely covers said clearance, and the intermediate position shown in Fig. 1, which provides for natural ventilation through the ventilation gap 11, opened between the upper edge of the chamber and the lower edge of main frame member 1. A lock casing 12 is secured on the top surface of sash member 2 and opposite the main frame member there is a strike plate 13 which in the locked position of the window engages locking pins, not shown, in lock casing 12.

The locking pins are controlled by a linkage 14 connected with a hinge mounted approximately centrally of lateral wall 10. The lock casing may through linkage 14 keep the chamber in the closed position or in the intermediate position. If the chamber is pivoted further away from the main frame, the locking pins release the connection with the strike plate, following which the window may be opened upon swinging the upper sash member 2 inwards.

Chamber 9 is produced from a blank in the form of a profile rod, e.g. extruded, made from light alloy or plastic material. Integrally with the lateral wall 10 the profile has a bottom 15 and an inwards facing lateral wall 10 together with a top side 17 extended beyond wall 16 into a protrusion or flange 18, the free end 19 of which is angularly bent downwards and provided with a bulge to form a finger grip with which chamber 9 may be swung and the window be opened.

When chamber 9 is in the closed extreme position the ambient air of an exhaust fan 20 accommodated in the chamber is drawn in through a number of inlet openings 21 at the bottom 15 and blown out of the chamber through a number of discharge openings 22 located adjacent the clearance between the main frame and the sash in lateral wall 10, from which the air passes out into the open air. This course of flow is indicated by the arrows B, C and D in Fig. 1, even though the chamber here is shown in the intermediate position.

The details of the illustrated embodiments of the window effecting the same function have the same reference numerals.

The embodiment of the window shown in Fig. 2 has a ventilation passage 23 in the upper sash member 2, thereby enabling the upper side of the sash member proper to continue up to the main frame member. Passage 23 debouches into the cavity space in flashing 4. Lateral wall 10 carries a gasket 24 encircling the discharge opening 22 of the chamber and preventing leakage at the transition to the passage.

If the sash has a stop member 25 rising from the top member and intended to be received in a groove in the lower side of the upper main frame member, passage 23 may be provided in the stop member and chamber 9 may then be connected with the locking device of the window, as described above and shown in Fig. 4.

The structure proper of the chamber with the fan appears most clearly from Figs 2, 3 and 5. Chamber 9 is provided with two insert components acting as end walls 26, in which a shaft 27 for the impeller 28 of the fan is journalled. An electric motor 29 is in driving connection with shaft 27 and is coupled to a power supply through a conduit 30 that may be drawn down along the sash to a holder, not shown, mounted in its pivot bracket.

Shaft 27 may carry a number, e.g. three, of spaced apart body plates 31 to which several inclined blades 32 distributed along the periphery are connected. The impeller 28 covers by and large the total length between end walls 26. Inlet openings 21 are designed as elongated, parallel piercings in bottom 15. The width of the inlet openings is larger than the width of the intermediate ribs which eliminate the opportunity for fingers or objects to get into the interior of chamber 9. Outlet opening 22 is as far as possible continuous throughout the length of the impeller but is interrupted by a fixture to secure linkage 14.

Experiments have shown that the degree of efficiency of the cross-flow fan is improved, partly if there is provided at the lower edge of the outlet opening a protuberance 33 projecting into the chamber and ending in the vicinity of the periphery of the impeller and, partly if a guide plate 34 starts from the inlet side of the impeller and extends to the upper edge of the outlet opening at continuously increasing distance to the periphery of the impeller. Guide plate 34 is supported by associated projections 35, 36 on the internal side of the chamber.

Each of the outlet openings 22 may, if desired, be

provided with a check valve flap 38 only allowing air to be discharged from the chamber. The flap may be balanced so that even a slight opening force is sufficient to expose the entire outlet opening.

Lateral wall 10 carried the one part of two hinges 39, the other part of which is secured in sash member 2.

The chamber forming profile rod may be composed of a number of profile rod members. The slotted inlet openings 21 may be replaced by a single elongated opening over the length of the impeller, said opening being then covered by a net or a similar access immpeding material. A plurality of juxtaposed ventilating chambers 9 may be used in case the window width is large. As an alternative of a cross-flow fan other types of fans may be used, such as axial fans mounted at the ends of chamber 9. An electrical contact member (not shown) may be mounted either on the sash part or on the main frame part in connection with ventilating chamber 9, said electrical contact member ensuring that the fan is out of operation when the casing is pivoted away from the locked extreme position. The contact member may be an electrical on-off switch or may alternatively be a sensor to activate an electronical control system for one or more windows. Alternatively to the shown exhaust fan the fan may naturally also be a fan ventilating air into the room on the inside of the window.

Claims

1. A window having a main frame (1) and a glass-supporting sash (2) installed therein and a flow passage for ventilation between the air inside and outside the window, said passage comprising a chamber (9) with an air inlet opening and an air outlet opening (22) and with a fan (20), characterized in that the window is openable and that the chamber (9) with the fan is installed on the window sash (2) which is movable in relation to the main frame (1).

2. A window as claimed in claim 1 and with a lock fitting comprising a lock casing (12) secured on a sash member, a striking plate (13) secured on an opposite main frame member and an operating device (14) for shifting the lock fitting between two locked positions and a release position in which the window may be opened, characterized in that the chamber (9) is pivotally mounted on the sash (2) and includes a handle rail (18) for manual operation, and that the operating device (14) is so connected with the chamber at a distance from the chamber pivot axis that the lock fitting is in locked position when the chamber is in one extreme position but is in the release position when the chamber is pivoted to the opposite extreme position.

3. A window as claimed in claim 2, characterized in that the chamber (9) includes an elongated profile produced from a light alloy or a plastic material and provided with end bottoms (26) and that the operating handle is a protrusion (18) formed integrally with the chamber.

4. A window as claimed in any of the preceding claims, characterized in that the fan (20) is a cross-flow fan with an elongated impeller (28) and that an air guide plate (34) extends at increasing distance to the periphery of the impeller from the lower part of the chamber at an air inlet opening (21) to an area next to the upper edge of a sideways facing air outlet opening (22).

5. A window as claimed in any of the preceding claims, characterized in that a check-valve flap (38) is provided at the air outlet opening (22) of the chamber, said flap allowing air outflow but not air inflow

6. A window according to any of claims 2 to 5, characterized by an electrical contact member to ensure that the fan is out of operation when the chamber has been moved away from the locked extreme position.

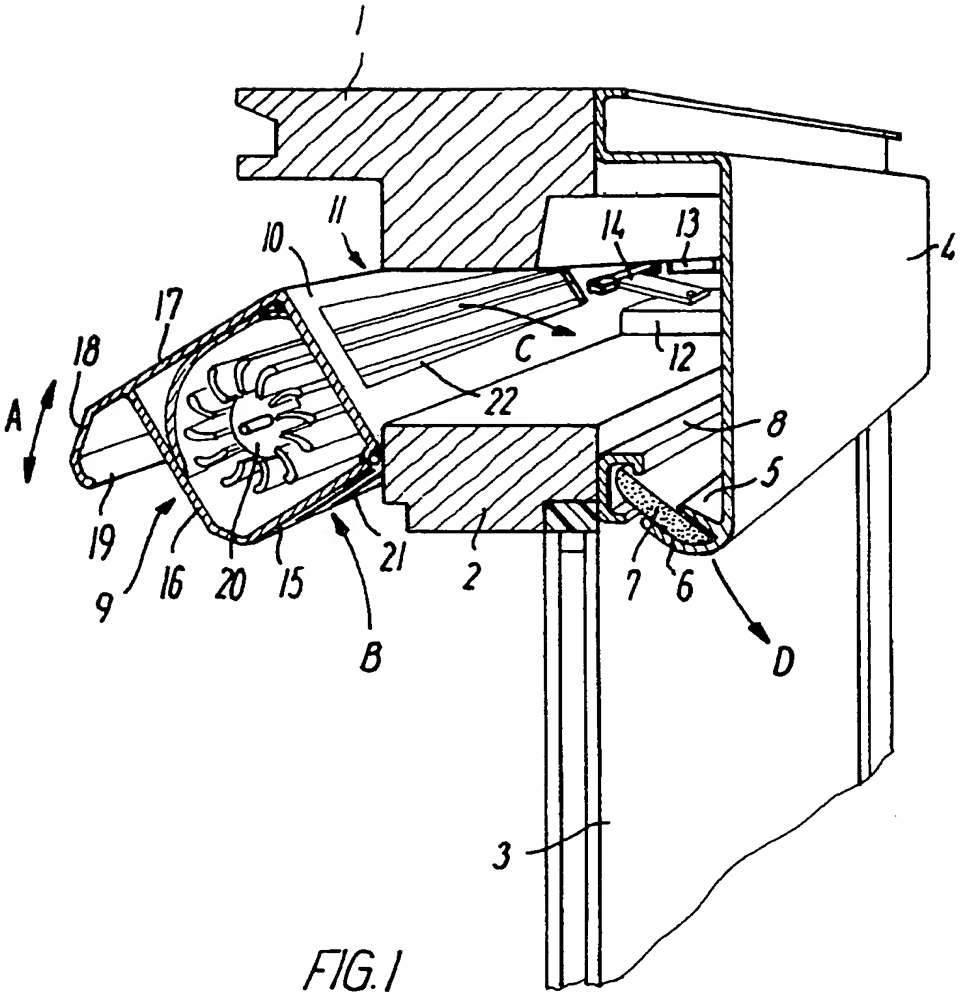

FIG. 1

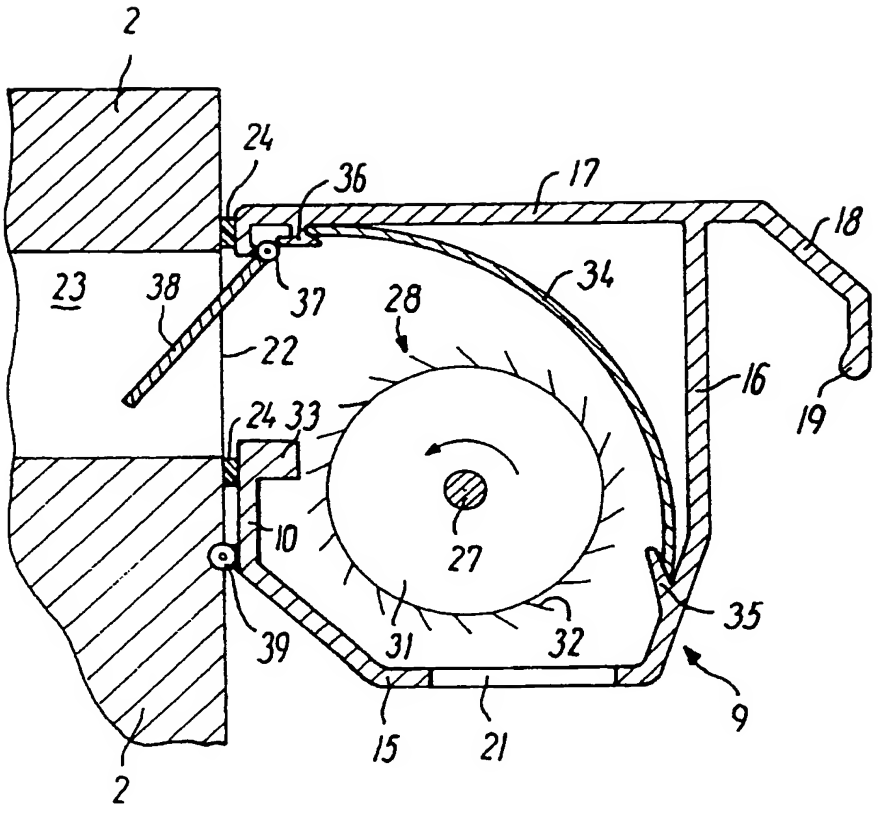

FIG. 2

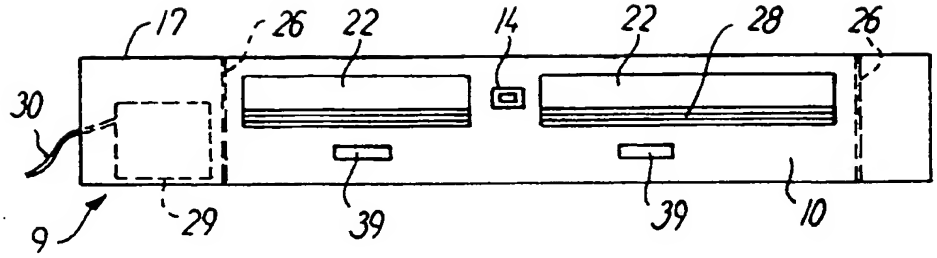

FIG.3

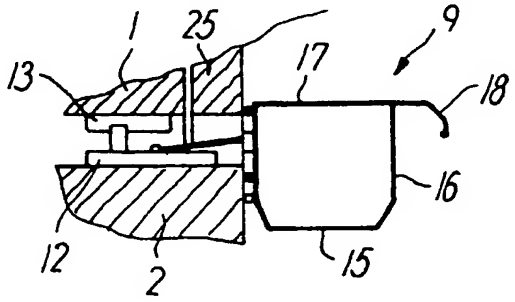

FIG.4

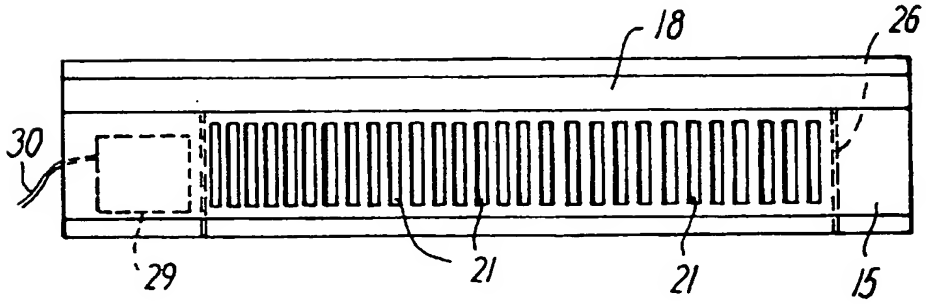

FIG.5

European Patent Office

EUROPEAN SEARCH REPORT

Application number
EP 91610042.3

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	WO-A1- 87/01155 (OY PARTEK AB) *See figure 1; claim 1*	1	E 04 D 13/03 E 06 B 7/02 F 24 F 13/18
X	CH-A5- 600 127 (J.H. BIERLICH) *See figure 3; column 3, lines 49-59*	1	
A	GB-A- 2 063 460 (CODE DESIGNS LIMITED) *See figure 2*	1-6	
A	US-A- 3 440 948 (J.V. EURICH) *See figure 1, detail 2*	1-6	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

E 04 D
E 06 B
F 24 F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
STOCKHOLM	19-07-1991	JUVONEN V.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO Form 1503 03.82